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• THESIS •

FOR DEGREE B. A. S.

College of Natural Science,

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M. S. Research of 1889.





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Notes on The Entomostraca of Champaign County, Ill.

Although the Entomostraca are a very important part of the invertebrate fauna when considered from an economic standpoint, yet not very much work has been done upon them in this state. In the Bulletin of the Illinois State Laboratory of Natural History Vol. II, Article V, List of the described species of fresh water crustacea from America, north of Mexico, by Lucien M. Underwood, Ph.D., only ten species are described as having been found in Illinois. Of the ten species given in the report as belonging to this state, six belong to the order Copepoda, namely:— *Diaptomus leptopus*, Forber, *D. sanguineus*, Forber, and *D. stagnalis*, Forber; *Aphraanticum labronectum*, Forber; *Cyclops agilis*, Koch, *C. insectus* Forber; *Canthocamptus illinoiensis*, Forber.



Belonging to the order Cladocera are *Daphnia pellucida*, P.E. Müller, and *D. retrocurva*, Forbes. Of the order Phyllopoda are *Limneta gouldii*, Baird, and *Branchipus serratus*, Forbes.

Of these ten species, I found five near Champaign, namely:—*Diaptomus stagnalis*, *D. sanguineus*, *Canthocamptus illinoensis*, *Branchipus serratus*,—and *Limneta gouldii*. Besides these I found eleven species not given in Underwood's list, namely,—*Simoccephalus vetulus*, *Daphnia pulex*, *Bosmina cornuta*, *Camptocercus macrurus*, *Pleuroxus denticulatus*, *Ceriodaphnia dentata*, *Chydorus sphericus*, and two undetermined species of *Cyclops*, one *Alona* and *Leypsis*, and one *Urosia*.

Article VIII,—On the food relations of freshwater fishes: a summary and discussion, by S.R. Forbes, Vol. II. of the Bulletin Ill. State Lab. of Nat. Hist. gives other species as having been found in the state. The species given are as follows:—*Daphnia pulex*, *D. hyalina*, *D. retrocurva*, *Simoccephalus vetulus*, *S. americanus*; *Ceriodaphnia dentata*,  
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*Scapholeberis mucronatus*, *Macrothrix laticornis*, *Bosmina longirostris*, *Chydorus denticulatus*, *C. sphericus*, *Pleuroxus dentatus*, *Acroporus leucocephalus*, *Camptocercus macrurus*, *Eurycerus lamellatus*, *Leptodora hyalina*; - all these of the Cladocera. *Cypris vidua* and *C. bifasciata* of the Ostracoda. *Cyclops thomasi*, *Episcura lacustris*, and *Limnocalanus macrurus* of the copepoda. This makes the total number that have been reported to be thirty-one. I identified twelve species from the neighborhood of Champaign, and found four others which I did not determine. One species of *Cyclops* is in all probability new, for I did not succeed in finding a description of it. It is certain that more species may yet be found by a careful observer in a series of collections lasting through an entire year, for some are more abundant at one season than at another. Although so very insignificant in size the Entomostraca bear a very close relation to one of the chief food supplies of man, as is shown by the



careful studies published in the Bulletin of the Illinois State Laboratory of Natural History Volumes I. and II.

The collections of which the present paper is a report were begun Sep. 28, 1887, and continued at intervals up to May 5, 1890. Specimens were found much more abundant in stagnant waters with a profuse growth of vegetation than in clearer running water. However one species was found as plentiful in an old well as in any other place; but the well is situated in the edge of a pond that was overgrown with vegetation but was dry at the time the specimens were taken. Some specimens were taken from clear running water, others from ditches by the Illinois Central R. R., and yet others from the ends of tile drains.

#### Order, Lepepoda.

Anterior segments of the body covered with a carapace; the biramous feet few in number, not exceeding five

pairs; single eye present; segments of body well marked, without shell forming reduplication of the skin; abdomen is without appendages. Five species were found belonging to this order;— two species of *Diaptomus*, two of *Cyclops*, and one of *Leanthocamptus*.

Genus *Diaptomus*, Westw.: Body elongated, six-jointed, first joint a cephalothorax formed by the fusion <sup>on</sup> of the head with one joint of the thorax. Abdomen five-jointed, in female apparently three-jointed. Antennae twenty-five jointed.

*Diaptomus stagnalis*, Forbes: Large and robust, red color. Cephalothorax much larger and longer than either joint of the thorax; body tapers slightly toward abdomen; anterior segment rounded in front; posterior margin of last <sup>thoracic</sup> segment with a process upon either side bearing a spine; segment ends abruptly. Antennae slender in female, long, but little shorter than cephalothorax, twenty-five-jointed, furnished with short scattered setae; in the male the



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the right antenna is modified and has a development of a hooked spine upon the antepenult segment.

The fifth foot is large, inner ramus in female slender, two-jointed; the terminal joint with two plumose setae longer than ramus; terminal segment twice as long as basal, the two reaching to end of basal segment of outer ramus. Outer ramus three-jointed, basal segment longest, second segment short, bearing one plumose and two smooth spines; first smooth spine is attached to the segment just above the process bearing the other two spines; the plumose spine is twice as long as the other two. Terminal claw of ramus almost straight, biserrate. Abdomen very small as compared with the body; short, slender; stylets short sub-elliptical, almost as broad as long.

The measurements of one specimen are as follows:-  
length of body 2.8 mm; length of abdomen 1.14 mm; total length 3.94 mm; length antennae 2.4 mm; length cephalothorax



1.2 mm.; depth of same 1 mm.; anal setae, female, .8 mm.; length fifth foot .6 mm.; greatest width body, first segment 1.08 mm.; width last thoracic segment at posterior margin 1.03 mm.; width abdomen .4 mm.; length caudal stylet .18 mm.

Found in pond southeast of Urbana in early spring and at the same time with *D. sanguineus*; also taken from ditch by I. C. R.R. north of Champaign in company with *Cyclops*, *Sinucephalus*, etc. April 7 1880.

*Diaptomus sanguineus*, Forbes.: Body largest in front of the middle, tapering slightly toward abdomen, much larger and longer than abdomen; head rounded in front; margin of last thoracic segment with process bearing a large spine and a smaller one; body terminates abruptly. Antennae twenty-five-jointed reaching beyond the body, slender in female; the right antenna in male modified to form a clasping organ by the modification of some of the segments and the development of others with the addition of spines. Abdomen five-jointed, but only three



joints apparent in female because some are fused together; much smaller than body; caudal stylets long, slender; setae long. Fifth foot large, bimanous; inner ramus in female one jointed, with short setae at tip, reaches near end of first segment of outer ramus, length .062 mm; outer ramus three jointed, basal segment as long as other two segments, .074 mm; terminal segment with two short and one long spine on outer side of ramus; terminal claw slightly curved, very finely biseriate.

The following measurements are given to show the proportions of the various parts:- length body 1.34 mm; abdomen .54 mm; total body and abdomen 1.86 mm; antennae 1.43 mm; stylet .12 mm; caudal setae .37 mm; fifth foot .22 mm; first segment of body .24 mm. Specimens were taken in early spring with *D. stagnalis*, and from a ditch by the L. C. R. R. April 7 1890. They are very much like *D. stagnalis* in shape, color, and general appearance; the principal differences are in the smaller size and greater



the greater length of the antennae of *D. sanguineus*, and the shape of the process on the last thoracic segment; the stylets also are longer and narrower.

Genus *Cyclops*, Müll. Body ovate more robust than abdomen, composed of large cephalothorax and four segments; abdomen four-jointed. Without a heart, mostly fresh-water animals. First pair of antennae many-jointed, seldom longer than cephalothorax; second pair of antennae four-jointed.

*Cyclops* sp? Body oval; thorax large, abdomen slender; body widest at posterior margin of cephalothorax. Antennae seventeen-jointed reaching to base of first segment, formula ----- . Stylets long, slender; setae plumose, - two inner long, - outer of the two long setae about two thirds the length of the inner; lateral seta not far from end of stylet. Fifth foot two jointed; basal joint very broad bearing a long seta; terminal joint cylindrical



bearing one long seta, and a short spine near end of segment.  
 Fourth <sup>outer ramus</sup> foot:- terminal segment - two outer lateral spines, two terminal spines are setae, three inner lateral setae:- inner ramus, terminal segment - one outer lateral spine, two long and two short terminal spines, two inner setae.  
 Third foot same as fourth except there are three inner setae on terminal segment of inner ramus.

Second foot:- outer ramus, terminal segment - two outer lateral spines, one short two long terminal spines and one <sup>are terminal seta</sup>, three inner lateral setae:- inner ramus <sup>terminal segment</sup>, one long one short outer lateral spines, two long two short terminal spines, three inner setae.

First foot:- outer ramus, terminal segment - two outer lateral spines, one terminal spine and two setae, two inner setae:- inner ramus, terminal segment - one lateral outer spine, three terminal spines, three inner setae.

Measurements of one specimen are as follows:- length body 1.3mm; first segment .52mm; width body .43mm; antennae



.52 mm; abdomen .5 mm; stylet .17 mm; caudal setae .5 mm

This species corresponds in most respects to *Cyclops viridis*, Fischer, but it is not so large. Whether it is a small variety of this species or not I do not know.

*Cyclops* sp? Body robust, oval .74 mm long; .37 mm wide; abdomen short slender, last segment with minute teeth on margin; stylet long slender; caudal setae four, two long, two short; all but outer barbed; inner seta short; second from inner side a third longer than the other long seta; long setae not barbed toward base; outer seta with very short spine at base; a short smooth <sup>lateral</sup> spine a little distance from tip of stylet; short seta on dorsal side of stylet near base of longest caudal seta. Antennae eleven jointed; formula ---=---=---; five long and short setae at tip of antenna; other pair of antennae four jointed with one short and five long setae at tip.

Fifth foot two-jointed, basal joint broad rounded, long seta on terminal segment of outer ramus, one of equal



length as inner ramus; second segment of outer ramus little longer than broad, bearing seta on a short columnar process at end of segment.

Fourth foot; - Outer ramus heavier and some shorter than inner ramus; first and second segments of outer ramus nearly equal in length and width; terminal segment two thirds length of other two, armed on outer side with two lateral spines, tip with two large spines, a very small spine and one seta, <sup>the</sup> seta slightly longer than longest spine; inner side with three setae; terminal segment of inner ramus slender, same length as terminal segment of outer ramus; one seta on outer side, two on inner, two long spines between two very short spines on tip.

Third foot; - Terminal segment of outer ramus with two outer lateral spines, three inner lateral setae, two long two short spines and one seta on tip. Outer ramus little shorter than inner, heavier. Terminal segment inner ramus same



length as terminal segment of outer ramus; with a lateral seta having a very short spine at base; three inner lateral setae; two long spines between two short ones at tip.

Second foot; - Outer ramus little shorter than inner; terminal segment of outer ramus tapering from insertion of first inner seta toward tip; armed with two outer lateral spines; three inner lateral plumose setae; three spines and one seta on tip, one short spine with a long one on either side the inner being longer than the outer. Terminal segment of inner ramus with one outer lateral spine; two long spines between two very short ones at tip; three inner lateral setae; lower margins of first two segments in both rami finely serrate.

First foot; - Inner ramus longer than outer; terminal segment stout; with one outer lateral seta; three inner lateral setae; one long and one short spine and one seta on tip. Terminal segment slightly longer than either of the other two.



Terminal segment of outer ramus short, stout, outer ~~side~~ with one short and two long spines; two inner lateral setae; two setae, one long and one short apical on tip. Same measurements are as follows:-

length body .74 mm; width .37 mm; length abdomen .33 mm; width .11 mm; length stylet .12 mm, width .037 mm; length caudal setae .56 mm second longest .33 mm.

I found no described species that appeared to be the same as this one; for this reason I believe it to be new. Although I believe this to be a new species yet I am not sure enough to describe and name it as new. Specimens were taken in the spring of 1890 from Crystal Lake in Nebraska.

### Genus *Leanthocamptus*, Westwood.

Body five jointed, first joint formed by the fusion of the head with the first joint of the thorax; each segment has at least one pair of appendages. First pair of

antennae short, six to nine jointed; second antenna two jointed. Abdomen not sharply marked off from body, five jointed, first two joints fused in female.

*Canthocamptus illinoiensis*.:- Small without much difference between the size of body and abdomen; body and abdomen about equal length. Head and first thoracic segment fused into a cephalothorax; five segments in body and five in abdomen of male, four in abdomen of female; abdomen tapers toward end; first segment in female largest and longest; abdominal segments emarginate behind, sharply serrate. Stylets oval, each bearing two long setae and other short ones, the long setae unequal, the length of the longer being greater than that of the abdomen. Antennae short, seven jointed in male eight jointed in female; process from third joint in male bearing long appendage reaching as far as end of antenna; third joint long, fourth short; long setae at tips of antennae, and bristles at various places.



Other pair of antennae two jointed with three long and two somewhat shorter setae on tip; secondary flagellum arising from basal segment, with its setae reach a little beyond end of said segment. Fifth foot two jointed, basal segment sub-elliptical. Measurements of one specimen gave the following results: - length 1mm; length of abdomen .45mm; caudal setae .7mm; antennae .22mm; antennae with setae .37mm; depth of body .24mm; length first segment .25mm. Color bright red. Specimens were found in very great abundance among algae in a small stream in Urbana April 13, 1890. They were so abundant as to completely hide the algae in patches a foot in diameter giving it a brick dust red color.

### Order Ostracoda

Generally very small animals with hard bivalve shells. "Seven pairs of appendages which function as

antennae, jaws, creeping and swimming legs. Rediform mandibular palp present. Abdomen short."

Genus *Gypsis*, Müller.

"Valves mostly subreniform or elongate oval, horny in texture. Upper antennae seven jointed; lower antennae five jointed. Second pair of jaws smaller than first, in the male prehensile. Postabdominal ramus long and slender bearing at the apex two long and unequal curved claws, and a short seta."

Two species were found but I did not identify either.

### Order Cladocera.

Body small laterally compressed, with exception of head enclosed in a bivalve shell. Have two large antennae fitted for swimming, and four to six pairs of swimming feet.

Nine species were found belonging to this order,



are each of the following genera:- *Monia*, *Simcephalus*, *Keniodaphnia*, *Daphnia*, *Bosmina*, *Pleuroxus*, *Alona*, *Camp-  
tocercus*, and *Chydorus*.

Genus *Monia*, Baird.

The following is very nearly the description given by Weismann and Gruber: Head prone, separated from the thorax by a depression; fornicer obscure; nostrum none; pigment fleck absent; antennules of the female large, moveable, furnished with a sensitive seta near the middle, flagelliform; antennules of the male very large, hooked at the end. The setae of the antennae are all ciliate; the tri-articulate ramus with five setae; posterior margin of the valves thicker in the median line; caudal setae very large, about twice in the length of the animal; anus above the claws; feet of the first pair of the male with a strong hook.

Only a single specimen of this genus was noticed and it was lost, so that no description could be made.

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Genus *Ceriodaphnia*, Dana.

"Resembles *Moina*; post abdomen is shorter, and its habitus resembles that of *Daphnia*; antennae are smaller, and the shell thick and coarsely reticulated"

*Ceriodaphnia dentata*, Birge. Body rounded, little longer than deep. Shell with simple hexagonal meshes; not very highly arched dorsally, much arched ventrally; contour regular, slightly flattened dorsally; deep depression between head and body; no beak; antennules short; shell not spined behind but angled; head long angulated in front of antennules; antennae little over half length of body. Postabdomen short, thick, truncate, armed with eight teeth. Claws long, with six to eight teeth varying in size, on outer side and also very fine teeth to tip of claw. Foruncles broad, rounded.

Measurements:- length 1.05 mm; depth .88 mm; depth head .49 mm; length antennae .55 mm; length setae .40 mm; length postabdomen .31 mm; width postabdomen .13 mm;



length claw .11 mm; length head .25 mm.

Genus *Simocephalus*, Schödl.

Form quadrate with the lower posterior margin sinuate, head with projection at eye, separated from body by a depression. Post abdomen truncate, excavated below, broad; anal teeth few, large, curved.

*Simocephalus vetulus*, Schödl. Head rather small, separated from body by a depression, depressed, about two and two thirds in total length, longer than deep, does not extend far beyond eye; arched evenly to point in front of eye where the curve is sharp; the ventral margin is concave to the short beak just at or below the pigment fleck and between the anterior margins of the shell. Pigment fleck very irregularly rhomboidal, generally with an elongation from one angle; much smaller than eye. Shell reticulated, lines extending transversely to long axis of body; not very highly arched dorsally, arched ventrally. Short teeth on posterior third of dorsal

arch to lower posterior angle of shell; ventral margin with hairs. Heavy blunt process instead of spine near middle of posterior margin. Antennae with setae fully two thirds total length of body; rami three jointed, four filaments on upper and five filaments on lower rami. Post abdomen short, broad, widest at top gradually tapering toward claws, with ten or twelve strong anal teeth. Claws long, curved, not spined, with lateral row of fine teeth to near middle of claw.

Measurements of one specimen:— length 2.86mm; greatest depth 1.86; antennae 1mm; setae .7mm; total length antenna 1.7mm; depth of head .7mm; length head  $5\frac{1}{2}$ mm; length claw .28mm;

Very abundant in a pond north of Champaign, with *Kamptocercus*, *Canthocamptus*, *Cyclops* etc. Ephippial females were taken in abundance from a pond southeast of Urbana May 5. 1890.



Genus *Daphnia*, Müller.

"Five pairs of feet. Inferior antennae two branched, one branch divided into four the other into three articulations. Head ~~protrudes~~ downwards into a more or less ~~pointed~~ beak. Superior antennae exceedingly small, one jointed, and situated under the beak."

*Daphnia pulex*, Leaus. Head more strongly arched than body not separated from body by a depression, unevenly curved, extending beyond eye a distance equalling width of eye; ventral margin deeply concave, beak long, lying close to anterior margin of body shell and extending ventrally nearly to a line with the ventral margin of the shell; head deeper than long; pigment fleck present, small. Antennae strong, bipartite, each ramus three jointed; undivided part long and strong, extending to anterior margin of head; outer ramus has four long jointed plumose setae, inner ramus five. Body oval, somewhat deeper in front ~~in old~~

~~specimens~~; finely reticulated; lower posterior and ventral margins serrated; unevenly arched, more convex toward the rear than in front in old individuals.

Dorsal spine of various lengths and may be attached to the dorsal posterior angle or as far down as the middle of the posterior margin, finely toothed; anal claw strong curved, spine at base; has five or six teeth in a row beginning very small at base and gradually increasing in length and size for one third length of claw, beyond which the claw is smooth. Post abdomen short slender, wider at top, tapering gradually toward claw, armed with ten or eleven uneven teeth which are larger toward the claws than toward the middle of the post-abdomen.

Measurements of one specimen:- total length 2mm; length head .34mm; depth head .57mm; length antennae .77mm; setae of antennae .5mm; total of antennae 1.27mm;



length post abdomen .43 mm; anal claw .14 mm; dorsal spine .26 mm; This species was found in great abundance in an old well in the edge of a dry pond south east of Urbana Sep. 28, 1887.

Genus *Bosmina*, Baird.

"Five pairs of feet; inferior antennae two branched, one branch divided into four the other into three articulations. Head terminating anteriorly in a sharp beak directed straight forwards. Superior antennae long many jointed and projecting from the extremity of the beak."

*Bosmina cornuta*: Baird. Very much rounded, small; shell greatly arched dorsally, slightly flattened anteriorly, truncate posteriorly with two short smooth blunt spines at posterior ventral angle of shell slightly curved upwards; shell not strongly arched ventrally, posterior two thirds of ventral margin

straight but not parallel with long axis of body; anterior third of ventral margin curved toward the anterior shell margin; body deepest in middle; head deep, short, not marked off from the body by a depression. Anterior pair of antennae large, long, curved outward and backward, with short setae above middle of anterior side. Posterior antennae biramous, outer ramus four jointed, bearing long setae at tips. Post abdomen short, broad, equal size whole length, truncate at end; claw long, strong, with three or four stout teeth near middle and very fine ones from thence to the tip. In one female the length of the body was .37mm; greatest depth .29mm; depth at posterior end .124mm; depth head .24mm; length anterior antennae .09mm; posterior antennae .09mm; outer ramus posterior antennae .05mm; length post abdomen .07mm; anal claw .037mm; width abdomen .05mm; length of spines at posterior ventral angle of shell .025mm;



young *Bosmina* in shell of parent .17mm; another specimen .37mm long had a young *Bosmina* .21mm long yet in the shell. Specimens were taken from Crystal Lake.

Genus *Lhydonus*, Zlach.

*Lhydonus* has a "globose form not obviously truncate behind; head terminating in a sharp, long, curved beak, which lies close upon the anterior margins of the shell; antennae short; eye larger than the pigment fleck; abdomen flattened, excavated in the male."

*Lhydonus sphaericus*, Baird. Body short, spherical, flattened behind; from above appears oval, but much broader anteriorly than posteriorly; shell hexagonally reticulated on ventral, posterior, and posterior dorsal surfaces; slightly longer than high. Shell very highly and evenly arched dorsally; very full in middle of

ventral margin, somewhat flattened towards the ends more so toward posterior end than toward the anterior; posterior margin short, nearly straight; greatest depth of shell in middle. Head small, short; beak long, sharp in female, curved inward; antennules moderate in female, large in male; antennae short, with two threejointed rami bearing long setae. Postabdomen short, rather broad, widest in middle and tapers slightly to the rounded end, is armed on the posterior margin with nine or ten short teeth; claw short, weak, with a basal spine. In male postabdomen excavated instead of rounded at end.

Measurements of one female:- length shell .45mm; depth .40mm; width anterior end .25mm; width middle .31mm; length beak .33mm; antennae .12mm; postabdomen .16mm; width post. abdomen .07mm; length claw .04mm.

This species was found in great abundance among the slime and vegetation of a swamp by Crystal Lake.



Not many other specimens were found with them, there being only a few individuals of *Cyclops*, *Pleuroxus*, *Leypis*, and *Simoecephalus*. Taken May 2 1890, also in limited numbers Sep. 30 1890.

Genus *Leamptocercus*, Baird.

Shell elongated, longitudinally striate, armed behind with minute teeth; head and back keeled. Post abdomen long, furnished with a lateral row of scales, narrowed toward end. Terminal claws with a simple basal spine, serrate; antennae usually with seven setae.

*Leamptocercus macrurus*, Baird. Body nearly rectangular, shell striate; deeper in front than behind, dorsal margin low arched; posterior slightly convex, finely toothed; ventral margin sinuate, concave in middle, convex at ends. Head small, keeled; keel extending the length of body; more strongly arched than body, depressed. Beak blunt, long, extending below nearly to

ventral line of shell, curved backward, convex anteriorly concave posteriorly. Eye larger than pigment. Antennae four jointed, reaching below beak, setae long; total length of antennae and setae about half length of body. Cultricles short, reaching nearly to end of beak. Intestine twice coiled. Postabdomen long, narrow, tapering toward end; narrow at top rapidly increasing to greatest width, then gradually tapering to end; posterior margin finely toothed. Claws long, slender, nearly straight to near the tip where there is a slight curve; one spine at base; claw provided with nine or ten teeth beginning very small near base of claw and becoming larger to a point a little beyond middle of claw beyond which it is smooth.

Measurements of one specimen:- length .8mm; depth .5mm; claw .12mm; postabdomen .35mm; antenna .09mm; Total length of postabdomen and claw equal to depth of body, and a little over one half its length.



The specimens were taken April 19, 1890 from a small pond north of Champaign, that contained much vegetation. They were found in company with *Simoecephalus*, *Leuctrocauptus*, *Cyclops* and *Eurytemora*.

Genus *Alma*, Baird.

Shell oval or quadrangular with rounded corners, striated longitudinally. Antennae short, biamous. Five pairs feet. Pigment fleck present. Abdomen segmented. Terminal claw with single spine at base. Back rather short.

*Alma* sp? Body sub-rectangular, considerably arched above, sinuate ventrally; convex ~~posteriorly~~, not angled at junction of valves; nearly straight anteriorly; hairs on ventral margin. Could not distinguish whether shell is smooth or finely reticulated. Head large, rather flattened dorsally; beak blunt, nearly straight, reaching almost to a line with the ventral margin of shell.

Eye twice as large as the pigment fleck. Greatest depth of body in middle; arch even from ventral posterior angle to head. Antennae biramous; ramus three jointed, - first segment length of other two; spine at base of second segment of inner ramus, two thirds distance from base; spine and long jointed setae at tip of ramus. Post abdomen short, broad; posterior margin sinuous with sharp angle one half distance from end; very fine teeth from angle to one third the distance from the end where the post abdomen is armed with large teeth about nine or ten in number. Lateral row of six or eight hairs or weak spines; teeth some larger toward end of abdomen. End of post abdomen truncate or rounded; claws not greatly curved, with one strong spine at base.

Measurements: - Length .44mm; depth .29mm; antennae .07mm; post abdomen .15mm; claw .05mm; width post abdomen .056mm; setae of antennae .15mm; length head .12mm. Only one specimen.



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was found.

Genus *Pleuropus*, Baird.

Shell strongly convex dorsally; striated or reticulated; beak long, acute, curved backward or forward; fornicer narrow; lower posterior angle toothed; post-abdomen slender, usually truncate and armed behind with a single set of sharp teeth on either side; the terminal claw has usually two spines and may be serrate.

*Pleuropus denticulatus*, Birge: Shell oval, dorsal margin highly arched, ventral margin very greatly arched toward the front but flattened from middle backward; posterior end truncate, narrow; shell much deeper in middle than at end. Beak, long, sharp, pointed downwards, slightly curved backwards. Ventral margin of shell fringed with setae, anterior margin toothed, ventral posterior angle armed with

three or four short teeth. Postabdomen rather long, slender, broadest at middle, armed on posterior margin with teeth; truncate or concave at end. Anal claws long, slightly curved, with two spines at base. Antennae three jointed, rami short, setae long; total antennae and setae about one third length body.

One specimen gave the following measurements: length of shell .52 mm; depth .28 mm; depth at posterior end .125 mm; length beak .12 mm; postabdomen .22 mm; claws .09 mm.

Specimens were found in Crystal Lake creek in Urbana above and below the dam, among algae. They were taken Sep. 30, 1887.

### Order Phyllopora.

" Body usually in part covered by a large carapace forming two valves in the lower forms. Two pairs of antennae, a pair of mandibles, and two pairs of maxillae, and in Apodidae a pair of maxillepedes. Feet broad and



leaflike. Abdomen not clearly differentiated from the thorax and the abdominal feet are not different in shape from the thoracic appendages. Body segments vary from seventeen in *Limneta* to sixty three in *Apels*. Eyes sessile or united in a single mass or stalked.

Genus *Limneta*, Loven.

"Carapace bivalved, nearly spherical, oval, smooth, no beaks or umbones. Head large, the front bearing the head enormous, and produced into a very large rostrum. Eyes small. Antennae short."

*Limneta gouldii* Baird. Only a single specimen was taken; found in a pond south east of Urbana.

Genus *Branchipus* Schöff.

"Body large and very stout, head large; male claspers elbowed, large and thick, complex, varying much in form. Head of male with a pair of frontal appendages hanging

down between the male claspers, and varying much in form. Body soft, without a carapace; head small, eyes stalked; eleven pairs of feet. A specialized abdomen with eight or nine segments, not bearing appendages."

*Branchipus serratus* Forbes. Only a single specimen of this species was taken, in the spring of 1870.















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